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ABSTRACT

This case study describes a project designed to improve science vocabulary and comprehension of migrant sixth-grade students in a rural farming-community middle school. The project combined intensive direct teaching of science vocabulary with the national unified curriculum implemented in 1984. The subjects of the project were migrant children performing below grade expectations in science. The 10-week project has improved the students' pre- and posttest scores by at least 20% as evidenced by the Unified Science Curriculum tests, by at least 40% as evidenced by teacher-made science-vocabulary tests, and by at least one letter grade in science. Research has shown that meaningful learning occurs when the learner relates new information to what is already known, or when a reader's cognitive structure and the new material are related. The limited exposure of life in a rural farming community restricts the vocabulary of migrant students. Under the 10-week project, vocabulary instruction was an integrated activity. Remediation activities, such as frequent purposeful drills and reviews of key scientific terms, were used to improve migrant students' comprehension and use of scientific vocabulary. The document recommends the intensified vocabulary training program for improving science skills among migrant students. Unit tests are included. (TES)

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ED325301

IMPROVING SCIENCE VOCABULARY OF SIX GRADE MIGRANT STUDENTS THROUGH A PROGRAM OF INTENSIVE DIRECT VOCABULARY INSTRUCTION

BY

MELBA Q. MORAN

A Practicum Report

submitted to the faculty of the Center for the Advancement of Education of Nova University in Partial fulfillment of the requirements for the degree of Master of Science.

The abstract of this report may be placed in a National Database System for reference.

May/1990

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Signed Melba Q. Moran

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ABSTRACT

Improving Science Vocabulary of Six Grade Migrant Students Through A Program of Intensive Direct Instruction.
Moran, Melba Q., 1990: Practicum Report, Nova University, The Center for the Advancement of Education.
Descriptors: Abstract Reasoning/Instructional Design/Science Activities/Science Tests/Scientific Literacy/Self Concept/ Social Cognition/Student Developed Material/Test Construction/ Verbal Development/Instructional Innovation.

The practicum proposal was directed at a targeted group of migrant sixth grade students who were performing below grade expectations in science. Remediation was provided in an effort to improve the migrant students' comprehension and use of basic scientific terms. The remediation activities enabled students to develop comprehension through frequent purposeful drill and review of key scientific terms. Vocabulary was presented as an integrated activity. Pre and Post test were administered to the migrant students. Results of mean scores showed at least a twenty percent increase in performance on unified science curriculum tests. Student grades also improved by at least one letter grade.

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Center For The Advancement of Education
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Observer Verification Form

Verification of Practicum Activity

Dear Observer:

Practicum students in Nova's M.S. and Ed.S. programs are asked to provide external verification that the project activities reported in their final practicum documents took place as described. You have been designated an observer to fulfill this confirmation function by the student named below. On this sheet, then, please write a note attesting to your knowledge of the project activity described in the final practicum report to which this will be attached. (Note that you are not asked to evaluate or make judgments about the quality of the project.)

Practicum Title: Improving Science Vocabulary of Six Grade Migrant Students Through a Program of Intensive Direct Vocabulary Instruction

Student's Name: Melba Q. Moran

Program Site: Lake Shore Middle School Date: 5-16-90

Observer's Name: Kerry W. Moore Kerry W. Moore
(please print---------and sign)

Observer's position: Science Department Head Phone #: (407) 924-5369

Observer's comment on impact of the project (handwritten): Learning science vocabulary is a never ending process for science students. The learning of science vocabulary is made easier by learning the prefixes and suffixes commonly used to formulate scientific words. Mrs Moran's program of intensive instruction of prefixes and suffixes used to formulate science

CHAPTER I

Purpose

As teachers are required to follow the county's unified science curriculum that had been implemented since 1984, there has been little opportunity for remediation of migrant students who are performing below grade level expectation in science. The purpose of the project was to improve science vocabulary and comprehension of migrant six grade students in a rural middle school. The project was designed to juxtapose intensive, direct teaching of science vocabulary words with the unified curriculum in order to improve scores on science tests.

The site of the practicum project was a middle school in a small farming community with a population of approximately 20,000. The town as well as the surrounding area produced a variety of crops. Many of the parents in the community worked on the farms. It was estimated that ninety per cent of the population's income came from farming or farm-related businesses. As a result of the production of seasonal crops, labor demands created a large migratory population within the community.

The middle school in which the project was implemented housed sixth to eighth grade students ranging from ten to fourteen years of age. The school, located on a twenty acre site, consisted of two campuses. One campus exclusively housed eighteen sixth grade units and four Migrant Early Childhood units. The other campus housed both seventh and eighth grade units. Both campuses used the Unified Curriculum of the county. The curriculum placed primary emphasis on four academic subjects: mathematics, language, arts, social studies, amd science.

The sixth grade campus provided departmentalized programs for 495 students. Of the students enrolled, ninety per cent was Black. The remaining ten per cent of the students was a mixture of Mexicans, Puerto Ricans, Cubans, Haitians, and Whites. For the school year, the administration identified 180 sixth grade students as migrants.

The writer of the practicum taught five periods of sixth grade science. The average number of students per period was twenty-one. The total number of students taught by the writer was 129, with fifty (50) students identified as migrants.

The migrant students posed a challenge for the writer because many of the migrants were enrolled for only a few months of the school year. Therefore, the migrant students were not only starting behind peers, but also, more than likely, had missed

the Standard Achievement Tests given early in the first semester of the school year. It was very difficult for the students to start school late and compete with students having had the opportunity to start school in the fall. As a result, the writer needed to adjust to the instructional program to meet the special needs of migrant students caught in the migratory pattern of farming communities.

After examining the migrant student's cumulative records (Appendix A), the writer discovered that of the twenty-one students in the homeroom that were tested on March 13, 1989, twelve or fifty-seven per cent ranked in Stanines 1, 2, and 3 on the Standard Achievement Test in science. The score rankings meant that the students were considered below average. The remaining nine or forty-three per cent's science Stanines were 4, 5, and 6. The rankings were considered average. Of the students that performed below average on the Standard Achievement Test, the migrant students also were not completing homework assignments and were failing chapter tests. The migrant students overall were poorly prepared and ill-equipped to meet the curricular expectations. As a result of poor performance, the students appeared to find science frustrating and unattainable.

The students in the target group were children with migrant parents. Because many of the migrant parents worked long hours,

the parents did not have the time nor the background to help the students with out of class assignments. Without practice outside of the class, students could not perform to the maximum capacity. Research conducted by Nelson-Herber (1984) indicated that students from deprived environments were often lacking in interest and motivation because of a discontinuity that existed between the school and the student's environment. As a result, the writer needed to deviate somewhat from the countywide established unified curriculum in order to meet the special needs of these students.

The sixth graders attending the middle school were grouped by reading levels. Approximately eighty-five per cent of the student body performed below sixth grade reading level. The textbook for science was developed on the sixth grade reading level; therefore, the textbook presented extreme difficulties for the majority of the students.

The writer recognized the need for active intervention in order to improve the science vacabulary of the target group. The project designed to provide intensive direct science vocabulary instruction to migrant students in the target group measured the following objectives:

1. After ten weeks of intensive direct science vocabulary instruction , students in the target group would improve the pre and post test scores by least twenty per cent as

evidenced by the Unified Science Curriculum tests recommended by the county.

2. After ten weeks of intensive direct science vocabulary instruction, students in the target group would increase pre and post test mean scores by at least forty per cent as evidenced by teacher made tests of science prefixes and suffixes designed to measure vocabulary recognition and application.

3. After ten weeks of intensive direct science vocabulary instruction, students in the target group grade point average would improve by at least a one letter average gain between nine week grading intervals.

CHAPTER II

IV. Research and Solution Strategy

Although extensive reading could be used to increase vocabulary knowledge, direct instruction that engaged students in construction of word meaning, using context, was most effective for learning specific vocabulary and for improving comprehension of related material (Nelson-Herber, 1984). Most teachers would agree on the importance for content area teachers to recognize the importance of vocabulary comprehension and the need for vocabulary instruction. However, what many teachers failed to recognize was that learning content vocabulary in science differed from learning a general vocabulary.

The science teacher had to use specialized techniques so that content could be learned along with scientific words because knowledge of vocabulary strongly related to reading comprehension (Mckeown, 1983). Therefore, the science teacher, in order to be effective, must learn to adjust, adapt, and modify the curriculum to meet the special needs of the students. The science teacher should not assume that all students come to class equipped with the understanding and skills necessary to perceive words well enough so that the students could comprehend the required reading in science.

One of the major problems of the migrant student in the target group was that many scientific terms were like a foreign language. The migrant students in the target group did not have prior experiences or previous knowledge with scientific terms which could be related to new words. Therefore, understanding science vocabulary caused a special difficulty for students in the target group because it was a vocabulary that was rarely used outside the class. Because migrant students did not have the opportunity to use the vocabulary in a variety of settings, students did not have the opportunity to reinforce the words already learned. Therefore, science for the students was not meaningful.

In the primary grades, most students were taught to perceive speech sounds, to note similarities and differences among sounds, to observe the likenesses and similarities between the printed symbols in order to recognize words. After learning phonic skills, students relied upon a learned skill to help them pronounce words that were already known in the vocabulary (Nelson-Herber, 1984). Given the above premise, it was easy to understand why specific word recognition skills posed a special problem for migrant students. The students were unable to use phonic skills to recognize words. The migrant students were incapable of recognizing the words even though some were able to

pronounce the words.

Meaningful learning (Thelen, 1986) occurred when the learner attempted to relate new information to what was already known. According to Thelen, meaningful learning occured when at least two things were properly organized: the reader's cognitive structure and the material to be learned. Cognitive structure could be defined as all of an individual's existing knowledge incorporated in abstract conceptual frameworks. The conceptual framework was described as all the little pictures or associations one conjures in the head when reading a word or sentence (Nelson-Herber, 1984). For example, if an individual saw the abstract word event, the individual could think of football game, garage sale, or concert. If the individual saw the term animal, then the individual would think of the animals which were familiar, such as dog, cat, or horse.

Because students did not have anything in the cognitive structure that related to the new material, then the new material was meaningless. Thus, the teacher had to help the student develop concepts in order for meaningful learning to take place.

A model, proposed by Smith (1982), called "top down" or information processing was effective. In the method the material to be learned was hierarchically organized. The most broad or general ideas were at the top, with less

inclusive concepts next, and so on. The advantage of the "top down" model was the ease with which students assimilated and retained new information because the cognitive structure could provide file folders for the new material. Since many science words represented major concepts that were not within easy reach of the migrant students, preteaching a chapter's vocabulary before the student read the material was essential.

One suggested format to use was to ask the students prior to reading a chapter to write down as many words that the students could think of which related to a concept that would be introduced in the chapter. The teacher then added to the list relevant scientific terms that were not previously mentioned by the students. By studying the terms mutually exclusive of the chapter, the students had the opportunity to create individual files.

As suggested by Vacca (1981) student involvement in learning a technical vocabulary was also essential but quite often a difficult step. Therefore, in order to reinforce and clarify the concepts learned , some educators recommended the use of student constructed organizers, called graphic organizers. The graphic organizer, a diagram of the interrelationship of the key vocabulary, hierarchically organized, showed how the vocabulary related to the new concepts. The process involved active student

participation in the learning process. After the students read the new material, the students were given the opportunity to analyze the relationships among the vocabulary by arranging and rearranging the terms of the graphic organizer. The activity was completed in small groups, and allowed the students to relate the terms to synonyms, to organize a list into categories, and to label the categories.

Another suggested format that helped students to develop a science vocabulary was a writing strategy developed by Cunningham and Cunningham (1983). The format was called student summarized writing (SSW). After the student studied the vocabulary and reviewed the chapter, the student was asked to summarize in writing what was learned. The method allowed the student the opportunity to utilize the newly learned scientific words. There were four suggested options that the teacher could use after allowing students five or ten minutes to write what was learned:

1. All papers were collected and the teacher read and responded to the papers.
2. Students paired off and read summaries to each other.
3. Three volunteers read the papers.
4. Students picked from a deck of cards, and the students who picked the cards with the numbers 1, 2, 3, or 4 read the papers.

Writing was also used as a means to develop thinking skills and to promote independent learning in science classes (Armes, 1986). By using writing as an instructional approach, the students had the chance to assume independent responsibilty for learning. Writing also provided a means of interrelating several science areas that had previously been studied separately (Sullenger, 1986).

Further research indicated that if listening skills were improved the students overall performance could improve (Blankenship, 1982). A student's success in class was directly related to the student's success as a listener. Most students needed to be helped to develop listening skills.

Based upon a review of the research presented, student involvement was the essential criteria needed for migrant students to improve in science (Vacca 1981). The writer helped the migrant students improve listening skills by repeating important material, using visual aids, keeping vocabualary on the student's level as suggested by Blankenship (1982). Listing the key concepts, analyzing the text (Vacca , 1981), and having students write about what they learned (Cunningham and Cunningham, 1983) provided other methods adopted for use by the writer. The above mentioned methods served to reinforce and

clarify meanings of scientific terms and concepts that students needed to know in order to succeed in science classes.

By employing an eclectic approach, the writer was able to develop an innovative program of intensive vocabulary training for migrant students in the middle school. The program was aimed at showing improvement in not only vocabulary comprehension but also in overall science achievement.

CHAPTER III

Methodology

The first task of the implementation stage was to select science words from Unit Three, chapters 10 - 15 of the science textbook (Appendix E). The words were used to develop not only a pretest for each chapter but also as words for students to study prior to reading a chapter. By studying key words and analyzing prefixes and suffixes in each chapter, emphasis in training was placed upon comprehension.

Week I. The writer administered the unified curriculum science unit pretest to the target group of migrant students (Appendix F). The writer also administered a teacher-made vocabulary science prefix and suffix pretest on chapters (Appendix G).

The writer later in the first week presented to the students a list of science prefixes and suffixes (Appendix H). When the lists were passed to the students, the writer explained the role the prefixes and suffixes had in relationship to understanding science terms. Intensive teaching, using the dictated format, was used. First, the writer stated each term as the students repeated each term. Then, the students would say the word alone. Afterwards, the students used the words in sentences.

The writer also developed Science Flash Cards in the first week. The flash cards were used to reinforce the student's knowledge of the prefixes and suffixes. Each flash card had either the prefix or the suffix on one side, and, on the opposite side of the card the meaning was listed. The first time students used the flash cards, the cards were used to determine the student's memory of the meaning. The writer would hold up a card and ask the meaning. During the activity, all students were standing. Students were recognized by the writer from the ones that raised hands and volunteered to give a verbal response. The student who answered incorrectly was asked to sit down. The students who were left standing served as group leaders. The group leaders served as helpers for the students who were seated.

Students, while in the groups, focused on the words, heard the words pronounced, discussed the words and built meanings in cooperation. Each group was asked to write sentences that expressed the word's meaning. Together the group presented the best sentences from ten pre-selected prefixes or suffixes.

In addition to the flash cards and the group activity, students completed the cross word puzzle (Appendix I) and completed other practice exercises (Appendix J) designed to help

students reinforce understanding and knowledge of newly learned prefixes and suffixes relating to science terms.

Week II. The chapters selected for teaching were entitled, "The Earth`s Resources" and " Changing in the Earth's Crust." Without prior preparation, the writer felt that students would find the chapters very difficult. The writer began the chapter discussion by giving an overview of the subject matter. After the chapter overview, the writer carefully discussed vocabulary words that were predetermined for the students. The words were added to the vocabulary list found at the end of the chapter.

The writer would then pronounce each new word as each student repeated. Then, the writer would ask students to locate the correct pronunciation of the word as well as break the word into syllables by using individual dictionaries.

The word meanings were explained on the bulletin board, and each student wrote the correct definition of the term as presented by the writer. By selecting relevant vocabulary words, the writer built up the expectation that students would find examples of each word as well as other information relevant to the overview when the students read the chapter.

The activity for the end of the second week was to have students' relate meanings to the newly learned terms. The writer helped initially with words that the students already knew. As a

example, the writer would take the word "history" and ask the student to attach the prefix "pre" to it. Afterwards, the writer asked the student to explain how the prefix changed the meaning of the term. The writer then repeated the procedure with other common words, such as, ante-date, co-worker, monotone, etc. Then, the students were asked to form words without the help of the writer and to share the words with the class. Each student was asked to respond orally to a couple of newly formed science terms.

A post test on science prefixes and suffixes was given for chapters 10 and 11 (Appendix G).

Week III. The teacher began the week by placing students in groups of four or five. The students within the groups worked together on the following vocabulary words:

1. Source	7. Recycling	13.Tectonic	19. Lava
2. Resource	8. Desalinate	14. Theory	20. Drift
3. Renewable	9. Feedstock	15. Mantel	21. Fault
4. Mineral	10. Fossil	16. Earthquake	
5. Landfield	11. Fuel	17. Seismograph	
6. Fertile	12. Reproduce	18. Dome Mountain	

The assigned group leader began by selecting a word to discuss with the other group members. Every student in the group

had an opportunity to discuss a word. The writer encouraged students to provide examples, compare, contrast and discuss how the students felt about the words. The group discussions required multiple recitation of the words and the meaning relationships.

Following the vocabulary activity, the writer then asked the students to read the text material. Students were also asked to answer the questions that appeared at the end of the chapter.

When individual students completed the reading assignment and answered questions, pertaining to the chapter, students worked in groups again to compare answers. Students were permitted to use the text, handouts and vocabulary activities as resources. The activities were learning experiences, not tests.

Weeks IV, V and VI. Same as Week I through III. However, the chapters studied were entitled, " Forcasting the Weather" and "Exploring Space." The vocabulary words that the writer selected from chapters 12 and 13 were the following:

1. Bar	7. Meteorology	13. Downdraft	19. Satellite
2. Draft	8. Forcast	14. Visibility	20. Chamber
3. iologis	9. Humidity	15. Hurricane	21. Expand
4. fore	10. Pressure	16. Thunderstorm	22. Shuttle
5. iso	11. Isobar	17. Astronomy	23. Rocket
6. therm	12. Updraft	18. Spaceprobes	24. Telescope

Week VII, VIII and IX. Same as weeks I, II, and III. However, the chapters studied were 14 and 15, entitled "Living Things" and "Animal Adaptations". The selected vocabulary words were as follows:

1. Cerebellum
2. Dominant Genes
3. Endocrine System
4. recessive Genes
5. Reproduction
6. Central Nervous System
7. Paralysis
8. Pituitary
9. Inherited Traits
10. Inherited Traits
11. Glands
12. Reflex
13. zygote
14. fission
15. Thyroid

Week X. The writer reviewed with the class all the new science terms. The Unified Curriculum Unit Test on chapters 10 - 15 was administered, and the results analyzed. The writer tabulated pre and post teacher-made tests of prefixes and suffixes. Appropriate grades were assigned to the target group of migrant students.

CHAPTER IV

Results

Vocabulary instruction and understanding strongly relate t reading comprehension. Therefore, in order to make the reading o material meaningful for the students, the students had to be abl to relate to past experiences. However, the limited exposure fro living in a rural, farming community restricted the vocabulary o migrant students. Therefore, it was important that key concept be taught prior to reading each science chapter. The learner the was able to relate to the new words or concepts.

The writer realized that the process of moving the student' vocabulary beyond the unknown level was costly in time. However the benefits were far greater in terms of student progress. Th tasks faced by migrant students in learning scientific terms an improving in science classes vary tremendously from non-migran students. For the above reason, the teacher employed differen methods of teaching science vocabulary to migrant students.

With emphasis placed upon scientific terms, science prefixe and suffixes as well as comprehension skills, the migran students improved in science classes. The results of student' performance was determined based upon a comparison of nine wee grades and pre and post tests results.

The first outcome objective was determined by the analysis of pre and post unified curriculum unit tests. Mean scores were calculated. Success criteria was measured by the difference between the pre and post test mean scores. The target students showed at least a twenty per cent improvement in post test chapter scores (Appendix K).

The second outcome objective was determined by the analysis of teacher made pre and post tests. A teacher made post test was administered on scientific prefixes and suffixes. Success criteria was measured by a comparison of a teacher-made pre test. Mean scores were calculated. The students showed a forty per cent improvement in mean scores (Appendix L).

By implementing a program of intensive vocabulary instruction to improve the migrant student's performance in science, each student's grade point average improved at the end of the nine week grading period. Students grades from the third and fourth nine-week period were converted to numerical ratings and a mean calculated for the target group. Success was determined by comparing the mean scores that migrant students in the target group received for the third grading period with the mean scores received for the fourth grading period. At least a one letter grade improvement was shown by the migrant students.

CHAPTER V

Recommendations

Although the Unified Curriculum of the county was designed for all sixth grade students, somehow it failed to address the special needs of migrant students. The intensive vocabulary training program proposed in the practicum may be used in conjunction with the unified curriculum in hopes of addressing some of the special needs of migrant students.

The writer identified relevant suggestions that could be helpful for teachers to use in improving the science comprehension of migrant students. The recommended improvements were the following:

1. Help students develop a science vocabulary by learning and using science prefixes and suffixes;
2. Help students to retain important concepts by using repetition and drill;
3. Preteach science terms to help students better understand chapter text;
4. Have students write about what has been learned.

Results have been shared with other science teachers. The writer plans to make a special presentation during a faculty meeting. The practicum has also been placed in the library's

reference section so that incoming teachers would benefit from the information presented.

The writer also provided a summary report to the department head and the building administrators.

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APPENDICES

APPENDIX A

***** CLASS REPORT *****

4/13/89

06

	%ile Rank	Stanine	STANINE PROFILE 1 2 3 Below Average	4 5 6 Average	7 8 9 Above Average
TAL READING (REVISED)	10	2	19 86%	3 14%	0 0%
WORD STUDY SKILLS	10	2	18 92%	4 18%	0 0%
READ COMPREHENSION (REVISED	16	3	13 59%	9 41%	0 0%
TAL MATHEMATICS	17	3	14 67%	7 33%	0 0%
CONCEPTS OF NUMBER	15	3	15 71%	5 24%	1 5%
MATHEMATICS COMPUTATION	26	4	10 48%	10 48%	1 5%
MATHEMATICS APPLICATION	19	3	14 67%	7 33%	0 0%
TAL LISTENING	4	2	21100%	0 0%	0 0%
VOCABULARY	6	2	19 90%	2 10%	0 0%
LISTENING COMPREHENSION	5	2	19 90%	2 10%	0 0%
TAL LANGUAGE	17	3	13 65%	7 35%	0 0%
SPELLING	23	4	11 52%	10 48%	0 0%
LANGUAGE	15	3	15 75%	5 25%	0 0%
TAL SCIENCE	13	3	15 71%	6 29%	0 0%
[illegible]	19	3	12 57%	9 43%	0 0%
		Stanines	1 2 3	4 5 6	7 8 9
		Percentile Range	[illegible]	[illegible]	[illegible]

WHAT THESE SCORES MEAN

This report shows how this student scored on the test battery named in the upper left-hand portion of this page. The scores are shown in the columns with the headings of "%ile Rank" (Percentile Rank) and "Stanine".

Percentile ranks range from 1 (low) to 99 (high), with 50 being average. This score is a comparison with other students in the same grade in the nation. A percentile rank of 75, for example, shows that this student scored higher than 75% of the students tested in the national sample.

Stanine scores range from 1 (low) to 9 (high), with 5 being average. Stanines are broad kinds of scores which avoid the danger of considering test scores as being overly precise. Each stanine includes a range of percentile ranks; for example, a stanine of 6 includes students who scored in the percentile range of 60 76.

The stanine scores of this student have been plotted in the section with the heading "STANINE PROFILE." This section shows a graphic picture of this student's scores, as compared with other students in the same grade across the nation. Stanines 1, 2, and 3 are considered below average, stanines 4, 5, and 6 are considered average, and stanines 7, 8, and 9 are considered above average."

APPENDIX B

CHAPTER TEST RESULTS OF MIGRANTS IN THE WRITER`S HOMEROOM CLASS*

Students # 1 - 21	Number Incorrect	Number Correct	Score
#1	3	22	88
#2	3	22	88
#3	7	18	72
#4	7	18	72
#5	9	16	64
#6	9	16	64
#7	11	14	56
#8	12	13	52
#9	12	13	52
#10	13	12	48
#11	13	12	48
#12	14	11	44
#13	14	11	44
#14	17	8	32
#15	17	8	32
#16	18	7	28
#17	22	3	12
#18	23	2	8
#19	24	1	4

Apendix B (cont't)

Student#	Number Incorrect	Number Correct	Score
#20	25	0	0
#21	25	0	0

* These scores are representative of the performance of students in the writer`s homeroom.

APPENDIX C

SAMPLE CHAPTER TEST

1. Relative humidity is measured with _____.
   a. a barometer
   b. a moisture meter
   c. an anemometer
   d. a wet-and-dry-bulb thermometer

2. The pushing down of air on all things is called _____.
   a. humidity
   b. relative humidity
   c. air pressure
   d. climatology

3. Instruments that orbit the earth and send back photographs and other information on the atmosphere are _____.
   a. wind socks
   b. weather satellites
   c. hygrometers
   d. weather balloons

4. A _____ is a short, violent rainstorm that most often occurs in late spring or summer.
   a. blizzard
   b. hurricane
   c. thunderstorm
   d. tornado

5. The comparison of the amount of moisture in the air and the amount of moisture the air is capable of holding is called _____.
   a. a low
   b. a high
   c. relative humidity
   d. humidity

6. Warm air _____ cool air.
   a. creates less air pressure than
   b. often causes fewer storms than
   c. creates greater air pressure than
   d. can hold less moisture than

7. Most weather data are gathered from _ _____.
   a. weather balloons
   b. land weather stations
   c. weather satellites
   d. airplanes

8. A warm air mass that contains a lot of moisture usually brings _____.
   a. hot, dry weather
   b. cold, dry weather
   c. hot, humid weather
   d. cool, humid weather

Appendix C (Cont'd)

9. A _____ is a winter storm that brings cold temperatures, high winds, and large amounts of snow.
   a. tornado
   b. thunderstorm
   c. blizzard
   d. hurricane

10. A relative humidity of 25 percent means that the air is holding _____ of the moisture it is capable of holding.
   a. all
   b. half
   c. one quarter
   d. three quarters

11. Which is <u>not</u> a feature of high relative humidity?
   a. Large amount of moisture in air
   b. Sticky, uncomfortable weather
   c. High barometer reading
   d. Moisture on a wet-bulb-thermometer not evaporating quickly

12. Which is <u>not</u> gathered by weather balloons?
   a. Air temperature readings
   b. Air pressure readings
   c. Photographs
   d. Humidity readings

13. Which is <u>not</u> part of the work of climatologists?
   a. Studying past weather patterns
   b. Making 30-day forcasts
   c. Collecting daily rainfall readings
   d. Studying worldwide weather conditions over a long period of time

14. Which is a feature of a tornado?
   a. Heavy snow
   b. Funnel cloud
   c. Twirling winds over ocean waters
   d. A rapidly moving warm front moving into a warm air mass

15. Which condition is <u>not</u> used to forecast weather?
   a. Movement of air masses
   b. Wind speed and direction
   c. Amount of precipitation
   d. Air pressure

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LAKE SHORE MIDDLE SCHOOL

Mrs. Barbara Altman
Principal

March 8, 1990

TO WHOM IT MAY CONCERN:

Mrs. Melba Moran, sixth grade teacher at Lake Shore Middle North Campus, is currently working on her practicum for a Master's Degree in Elementary Education. Her idea is to develop an intensive direc vocabulary instructional program to improve the science vocabulary of sixth grade migrant students.

We are looking forward to the implementation phase of her project at the school.

Sincerely,

Barbara Altman

Principal

ROAD

APPENDIX E
SAMPLE OF

SCIENCE WORDS THAT STUDENTS WILL STUDY FROM UNIT THREE

Anemometer	Forecast	Paralysis
Astronomy	Fossil	Pituitary
Cerebellum	Fuel	Pressure
Chamber	Gland	Puberty
Desalinate	Humidity	Recycling
Dome Mountain	Infancy	Reflex
Dominant Genes	Inherited Traits	Reproduce
Downdraft	Isobar	Reproduction
Draft	Isotherm	Rocket
Drift	Landfill	Satellite
Earthquake	Lava	Seismograph
Endocrine Gland	Mantle	Shuttle
Endocrine System	Mariculture	Spaceprobes
Fault	Meteorology	Tectonic
Feedstock	Mitosis	Thermometer
Fertile	Nodule	Updraft
Fission	Ore	Zygote

APPENDIX F

UNIT TEST

DIRECTIONS: There are four choices for each of the following test items. E
choice has a letter in front of it. Fill in the answer space that has the s
letter as the answer that you picked.

1. Wind, speed and direction are indicated by _____.

   a. a wind sock
   b. a wind vane
   c. an anemometer
   d. a wet-and-dry-bulb thermometer

2. _____ is a process for removing oil and gas deposits under the ocean flo

   a. Recycling
   b. Strip mining
   c. Offshore drilling
   d. Desalination

3. A method of farming the oceans for food is called _____.

   a. mariculture
   b. agriculture
   c. desalination
   d. morphology

4. Cool air _____ than warm air.

   a. creates less air pressure
   b. often causes more storms
   c. creates greater air pressure
   d. can hold more moisture

5. The theory of plate tectonics states that the continents _____.

   a. formed when the earth's crust cooled and shrank
   b. form rigid plates that float on the oceans
   c. are large slabs of cooled lava that float on the oceans
   d. ride atop rigid plates that move over the liquid part of the eart
      mantle

6. Air, soil, and water are _____ resources.

   a. living renewable
   b. nonliving renewable
   c. living nonrenewable
   d. nonliving nonrenewable

7. Meteorologists analyze vast amounts of weather data quickly and accu by using _____.

   a. computers
   b. satellite photos
   c. land weather stations
   d. weather balloon

8. Lenses or mirrors are used in _____ to gather light given off by di objects.

   a. an optical telescope
   b. a radio telescope
   c. a dish radio telescope
   d. a linear array telescope

9. Oil is taken from the ground by _____.

   a. recycling
   b. digging wells
   c. collecting nodules
   d. strip mining and shaft mining

10. Cold temperatures, high winds, and large amounts of snow characteristics of a winter storm called a _____.

    a. thunderstorm
    b. hurricane
    c. tornado
    d. blizzard

11. _____ are cracks in the plates of the earth's crust, along which the move.

    a. Faults
    b. Ridges
    c. Earthquakes
    d. Volcanoes

12. Resources that are replaced naturally are _____.

    a. renewable resources
    b. nonrenewable resources
    c. fossil fuels
    d. metals

13. Lifting objects against Earth's gravity into space is one use of

    a. satellites
    b. weather balloons
    c. space probes
    d. rockets

14. Any object that revolves around another object in spaces is called a _____.

a. rocket
b. satellite
c. space probe
d. space shuttle

15. _____ is used to measure relative humidity.

a. An anemometer
b. A wet-and-dry-bulb thermometer
c. A moisture meter
d. A barometer

16. _____ is the push exerted by air on all things.

a. Climatology
b. Humidity
c. Relative humidity
d. Air pressure

17. A pure, hard, nonrenewable resource found in the earth's crust is called a _____.

a. salt
b. nodule
c. mineral
d. fossil fuel

18. _____ are spacecraft sent to gather information on the moon and planets.

a. Rockets
b. Satellites
c. Space probes
d. Space Shuttles

19. _____ orbit the earth and send back photographs and other information on the atmosphere.

a. Weather balloons
b. Wind socks
c. Weather satellites
d. Hygrometers

20. The collecting and re-treating of materials for reuse is called _____.

a. desalination
b. drilling or mining
c. recycling
d. insulating

Appendix G

Sample Prefix-Sufix Pre and Post Test

Directions: Match the alphabet with the meaning of the prefix or suffix.

___	1.	Pertaining to sea water	A. -logy
___	2.	Not	B. Atmos-
___	3.	Do over again	C. Mari-
___	4.	Pertaining to air	D. Litho
___	5.	Having to do with	E. ure
___	6.	One who	F. seis-
___	7.	Science of	G. Geo-
___	8.	The act of	H. Non-
___	9.	A way from	I. -tion
___	10.	Science or study of	J. -ic
___	11.	Pertaining to stone	K. graph
___	12.	Something written, or recorded	L. -logy
___	13.	Act or result	M. de-
___	14.	Cause by earthquake, explosion	N. -ist
___	15.	The earth	O. re-

APPENDIX H

Prefix and Suffix List

PREFIX	WORD MEANING	PREFIX	WORD MEANING
1. ambi	both	11. homo	same
2. ante	before	12. inter	related
3. anti	against	13. neo	new
4. auto	self	14. neur	nerve
5. bi	two	15. osteo	bone
6. co	together	16. pre	before
7. di	two	17. proto	first
8. epi	outside	18. psycho	mind
9. hetero	different	19. somat	body
10. histo	tissue	20. spermato	sperm/seed

SUFFIX	WORD MEANING
1. al	of, like
2. cyte	cell
3. dermis	skin
4. ic	having to do with
5. logy	the study of
6. ous	full of

APPENDIX I

VOCABULARY CROSS WORD PUZZLE

DIRECTIONS: The following science terms are hidden in the puzzle. Circle each term you find. Then on a space provided on the right, write the meaning of each term. Use the Glossary in your textbook or a dictionary to check your definitions.

meteorology	wind sock	weather map	barometer
anemometer	buoy	satellite	updraft
tornado	isobar	wind vane	isotherm
forecast			

S B A R O M E T E R F
M Q T R S V W A B C O
W E A T H E R M A P R
I N T L M D C Z Q V E
S A T E L L I T E B C
Z V I S O T H E R M A
A C U P D R A F T O S
W L T M A Y O U D Q T
I I S O B A R L E R B
N D N L R F J O O P U
D S Z D B N I C K G O
S A B I V L A I S O Y
O L E A T A S D S V M
C J O K O N N E O T U
K A N E M O M E T E R

APPENDIX J

Review: A Prefixed Fairy Tale

Instructions: In the space provided fill in the meaning of each prefix. Feel free to use the list of prefixes provided or your dictionary.

Mono( ) day, Little Red Riding Hood set off pro ( ) grandma's house. For a change she decided to try a hetero ( ) road instead of traveling the homo( ) one she always took. Ambi( ) routes would take her to grandma's house, but the neo ( ) one was much shorter than the old one.

Pre ( ) she left, she proto ( ) packed a basket filled with poly ( ) goodies. She had dis ( ) gone far when she came upon a wolf. The wolf stepped right in pro ( ) of Little Red.

Post ( ) a brief struggle with the wolf, Little Red noticed someone standing by. She was with her friend, the Woodsman.

Appendix K

Analysis of Pre and Post Unit Tests

Student#	Average before Practicum	Unit Tests 1	2	3	Average After Practicum
1.	68	72	78	80	77
2.	72	84	90	93	89
3.	70	86	88	89	88
4.	64	79	82	86	82
5.	64	85	87	91	88
6.	48	64	68	72	68
7.	47	88	89	94	90
8.	76	92	95	96	91
9.	52	64	71	73	69
10.	60	78	83	85	82
11.	48	76	78	80	78
12.	28	64	72	80	72
13.	56	72	78	80	77
14.	60	64	71	78	72
15.	79	84	82	79	82
16.	60	68	79	89	79
17.	12	48	62	70	60
18.	28	56	82	70	69
19.	40	80	59	91	77
20.	12	44	79	66	63
21.	8	59	48	68	58

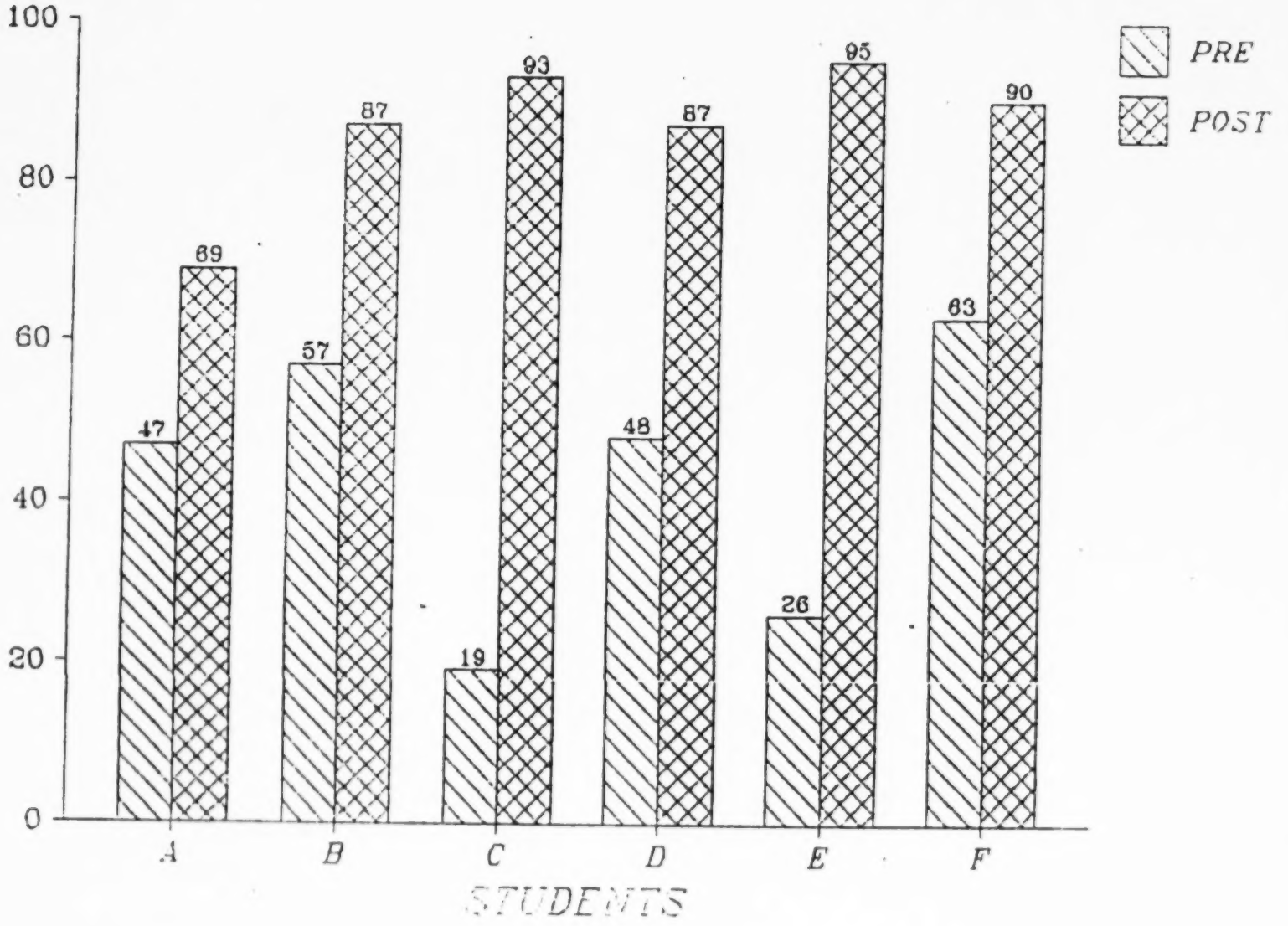
Appendix L

Analysis of Prefix - Suffix Pre and Post Tests

Student #	Pre-test	Post - test
1.	62	100
2.	62	94
3.	56	94
4.	56	88
5.	54	88
6.	50	82
7.	50	82
8.	42	76
9.	42	70
10.	42	70
11.	36	70
12.	36	62
13.	32	74
14.	30	94
15.	30	82
16.	24	68
17.	24	72
18.	18	74
19.	18	56
20.	0	82
21.	0	76

APPENDIX M

Comparative Analysis of Test Scores



END

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Date Filmed

March 29, 1991